EXHIBIT G

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IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

TQ DELTA, LLC, **Plaintiff,** v.	§ § § § §	**JURY TRIAL DEMANDED** [redacted]
COMMSCOPE HOLDING COMPANY, INC., COMMSCOPE INC., ARRIS INTERNATIONAL LIMITED, ARRIS GLOBAL LTD., ARRIS US HOLDINGS, INC., ARRIS SOLUTIONS, INC., ARRIS TECHNOLOGY, INC., and ARRIS ENTERPRISES, LLC,	§ § § § § § § §	**Civil Action 2:21-cv-310-JRG** **(Lead Case)**
NOKIA CORP., NOKIA SOLUTIONS AND NETWORKS OY, and NOKIA OF AMERICA CORP. **Defendants.**	§ § § § §	**Civil Action No. 2:21-cv-309-JRG** **(Member Case)**

OPENING EXPERT REPORT OF TODOR COOKLEV, PH.D.

Dated: August 29, 2022

Todor Cooklev, PhD.

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these topics. In my opinion, neither CommScope nor Nokia has identified a non-infringing alternative (known as an "NIA") that would have been or is acceptable.

1272. Several of the alternatives are directed to TQ Delta patents that I have found to be essential to one or more DSL standards. I do not consider alternatives to patents essential to a DSL standard to be acceptable, as the modified product would then either be noncompliant with the standard or the standard would need to be changed to accept the alternative, requiring considerable work and disabling the products, or entire features of products, produced under the current standard. One of the greatest considerations of standards is that they provide interoperability between devices made by different manufacturers. If the SEP is not practiced, the device would not interoperate at all, or would not interoperate to provide a particular feature, with devices made by other manufacturers that were standard compliant.

1273. My general understanding is that during the DSL standards development process, the expert members of the DSL standards groups evaluate many solutions and select the solution they consider the best. Therefore, as part of the standards process, other alternatives are considered but rejected as being inferior to the chosen solution.

1274. There is mix of patents that are standards-essential patents and non-standard essential patents at-issue in this case. The Family 3 and 9A Patent claims asserted against Nokia and CommScope are not standard essential patents (as I use that term below) because, while the relevant standards show that many limitations are met, the claims have additional elements that are not expressly called for by the VDSL2 standards (Family 3) and G.inp standards (Family 9A), including the use of a "shared memory." The Family 2 Patent claims asserted against Nokia are also, in my opinion, not standard essential patents as I use that term below. While the bonding standards show that a number of claim elements are met, the claims include additional limitations

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regarding bonding configurations that are not expressly called for by the bonding standards (such as the use of multiple transceivers, a plurality in bonded mode and at least one in native mode). The Family 2 Patent claims asserted against CommScope, however, are standard essential patents.

1275. The remaining patents are, in my opinion, standard-essential: the Family 1 Patent asserted against both Nokia and CommScope is essential to the identified functionality in VDSL2; the Family 2 Patent asserted against CommScope is essential to the identified functionality in the PTM bonding standards; the Family 4 Patent asserted against CommScope and Nokia is essential to the identified functionality in VDSL2; the Family 6 Patents asserted against CommScope and Nokia is essential to the identified functionality in VDSL2; the Family 9B Patents asserted against CommScope and Nokia is essential to the identified functionality in G.inp; and the Family 10 Patents asserted against CommScope and Nokia is essential to the identified functionality in VDSL and G.inp.

1276. I understand that both [redacted] that, as I understand it, [redacted]

[redacted]

24. A non-transitory computer-readable information storage media, having stored thereon instructions, that when executed by one or more processors, cause to be performed a method to operate a communications device comprising:

supporting a plurality of modes of operation on a plurality of wireless links, wherein:

during a first mode of operation, the communication device concurrently supports a first multicarrier access solution and a wireless communications solution, and

during a second mode of operation, the communication device concurrently supports the first multicarrier access solution and a second, different, wireless communications solution, wherein the first and the second wireless communications solutions use the same FFT (Fast Fourier Transform) computational resources.

* * *

1361. On the front page of each patent that I did not eliminate as a potential DSL standard essential patent, I hand-wrote the standards to which one or more independent claims were likely standard essential.

1362. From my original list of 1,100 patents, I identified 33 patents as being likely standard essential to one or more DSL standard. For those 33 patents, I indicated the standards to which the independent claims are standard essential.

1363. During my analysis, I determined that one or more independent claims of the following patents are likely essential to the practice of the following DSL standards:

U.S. Patent No. 5,400,322 – ADSL2, ADSL2+, VDSL2, G.inp, G.vector

U.S. Patent No. 5,519,731 – ADSL2+, VDSL2, G.inp, G.vector

U.S. Patent No. 6,236,726 – VDSL2, G.inp, G.vector

U.S. Patent No. 6,266,348 – ADSL2, ADSL2+

U.S. Patent No. 6,370,156 – ADSL2, ADSL2+, VDSL2, G.inp, G.vector

U.S. Patent No. 6,445,730 – ADSL2, ADSL2+

U.S. Patent No. 6,498,808 – ADSL2, ADSL2+, VDSL2, G.inp, G.vector

U.S. Patent No. 6,647,068 – ADSL2, ADSL2+, VDSL2, G.inp, G.vector

U.S. Patent No. 6,768,772 – G.hs

[redacted]

U.S. Patent No. 6,775,305 – G.bond

U.S. Patent No. 6,885,696 – ADSL2, ADSL2+, VDSL2, G.inp, G.vector

U.S. Patent No. 6,934,326 – G.hs

U.S. Patent No. 6,987,802 – G.hs

U.S. Patent No. 7,012,954 – G.hs

U.S. Patent No. 7,453,881 – G.bond

U.S. Patent No. 7,471,721 – VDSL2, G.inp, G.vector

U.S. Patent No. 7,508,876 – ADSL2, ADSL2+

U.S. Patent No. 7,860,175 – ADSL2, ADSL2+, G.inp

U.S. Patent No. 7,881,403 – VDSL2, G.inp, G.vector

U.S. Patent No. 7,916,776 – ADSL2, ADSL2+, VDSL2, G.inp, G.vector

U.S. Patent No. 7,929,471 – ADSL2, ADSL2+, VDSL2, G.inp, G.vector

U.S. Patent No. 8,027,379 – ADSL2, ADSL2+, VDSL2, G.inp, G.vector

U.S. Patent No. 8,175,140 – ADSL2, ADSL2+, VDSL2, G.inp, G.vector

U.S. Patent No. 8,179,774 – G.vector

U.S. Patent No. 8,218,419 – G.vector

U.S. Patent No. 8,218,610 – VDSL2, G.inp, G.vector

U.S. Patent No. 8,340,200 – ADSL2, ADSL2+, VDSL2, G.inp, G.vector

U.S. Patent No. 8,468,411 – VDSL2, G.inp

U.S. Patent No. 8,483,369 – G.vector

U.S. Patent No. 8,718,158 – VDSL2, G.inp, G.vector

U.S. Patent No. 8,831,031 – G.bond

U.S. Patent No. 9,154,354 – VDSL2, G.inp, G.vector

[redacted]

U.S. Patent No. 9,621,198 – G.inp

1364. It is my understanding that Mr. Putnam used the results of my analysis to extrapolate from my conclusions about the sample set of patents relative to the larger universe of potentially standard essential DSL patents (from the original list of 14,848 patents) and to provide an opinion about the number of likely standard essential DSL patents.

E. Memory Savings

1. Family 3 Patents

1365. I have been asked to investigate and opine on issues relating to the memory savings from use of the Family 3 patents.

1366. In forming my opinions regarding memory savings, I have considered and relied upon my education, background, and experience, as well the VDSL (G.993.2) standard, the Heller Report, and any documents identified herein.

1367. Dr. Peter Heller, Ph.D., has provided an opinion regarding [redacted] In particular, he explained that [redacted]. He further explained that, [redacted].

1368. Dr. Heller's opinion relates to [redacted]